#3997
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TECHNICAL MEMORANDUM

Utah Coal Regulatory Program

February 9, 2012

TO: Internal File

THRU: Steve Christensen, Environmental Scientist III/Team Lead SKC

FROM: Priscilla Burton, Environmental Scientist III/Soils PWB by SRS

RE: Construction of Burma Evaporation Basin, Genwal Resources, Inc., Crandall Canyon Mine, C/015/0032, Task #3997

SUMMARY:

This Significant Revision to the Mining and Reclamation plan was received on January 12, 2012. The amendment details 7.32 acres of additional disturbed area (Chap. 1, p. 1-9) in T 17 S, R 8 E Section 5 within Lot 6 (see Plate 1-1). The additional disturbance will be on SITLA land under a 30 year lease (Special Use Lease Agreement 1708, Appendix 1-16). The evaporation basin will be approximately 200 ft long x 100 ft. wide x 6 ft. deep, to be constructed as described in Appendix 7-66. Using the Permittee's estimates, of 1.5 inch accumulation per year, the life of this facility is twenty four years, at which time the dried waste will be at the design maximum of 36 inches, leaving 24 inches of freeboard (Chap. 5). (As stated in the plan there is room for expansion to the east and west.) The waste will be covered with 48 inches of soil.

The application is not recommended for approval until the following issues are resolved:

R645-303-313.100 requires that the applicant submit a statement that no prime farmland exists. [PB]

R645-301-231/100, The plan should outline on a map the area designated for boulder removal and topsoil salvage. [PB]

R645-301-231.400, The topsoil storage pile should not be triangular in cross section, but trapezoidal. [PB]

R645-301-536.320, A sampling and monitoring plan for the waste should be developed to be conducted at five year intervals (mid-term) or with every 7.5 inches of waste deposited. Grab sampling of the waste should be monitored in accordance with 40 CFR 264.13 and with the

parameters described in the Division's Guidelines for Topsoil and Overburden, Tables 3 & 7. [PB]

R645-301-536, the plan should provide for depth measurement of the iron precipitate layer every five years, occurring during the mid-term review. [PB]

R645-301-542.730, Upon final reclamation, the first 18 inch lift should be incorporated into the mine waste with ripping or other tillage. In this manner, the waste will be incorporated into the soil and will not create a chemical or physical barrier to roots, promoting revegetation success. [PB]

R645-301-244, The type and quantity of wood fiber mulch (hydromulch) should be specified. [PB]

R645-301-242, Redistribution depth of the 1,137 cu yd topsoil will be six inches over the 1.41 acres as described in (Chap. 2), however, Chap. 3 indicates that the topsoil will be respread to a depth of 12 inches in item c. Please make the appropriate correction. [PB]

R645-301-234.230, Use of surface mulch to provide protection and vegetation establishment on the topsoil stockpile is described in Chap. 2; however the quantity per acre should also be described. [PB]

R645-301-232.400, The permitted area is 7.32 acres; however the proposed disturbed area is 1.41 acres. The plan should describe interim reclamation of the land which will not have topsoil removed, but which may be affected by equipment moving boulders and topsoil to storage locations. [PB]

TECHNICAL ANALYSIS:

ENVIRONMENTAL RESOURCE INFORMATION

Regulatory Reference: Pub. L 95-87 Sections 507(b), 508(a), and 516(b); 30 CFR 783., et. al.

SOILS RESOURCE INFORMATION

Regulatory Reference: 30 CFR 783.21; 30 CFR 817.22; 30 CFR 817.200(c); 30 CFR 823; R645-301-220; R645-301-411.

Analysis:

The 2011 soil survey by Long Resource Consultants is found in Attachment 6 of Appendix 7-66. According to the report, the soils form an alluvial fan on top of a terrace pediment and the alluvium is bisected by shallow ephemeral drainages (p. 1). The site is at an elevation of 6470 ft. with a 3 - 5% slope to the SE. The site is located immediately off of County Rd 333, adjacent to XTO well AP #43 015 30479 in Lot 6, Sec. 5, T. 17 S., R. 8 E. (see Inspection Report #2690).

Pinyon pine and Utah juniper were removed from the area approximately 30 – 40 years ago, but both species have re-established with heights of 6 – 12 feet (p. A-1, Attachment 6) under a climate regime of 13 inches average annual precipitation (p. 1, Attachment 6). Other vegetation present was fourwing saltbush, Salina wildrye, crested wheatgrass, yucca, opuntia, bluegrass, mormon tea, and rabbitbrush, as described in Appendix A of Attachment 6.

The soil uniformly mapped as Strych very stony very fine sandy loam, 3 to 30% slopes. These are deep, well drained soils (p. 4 Attachment 6), not suitable for impounding water. The soil was estimated to have 35 – 67% rock fragments on the surface and 15 – 30% gravels in the profile. The soil is 63 to 85% sand and very fine sand in the surface 30 cm (approximately equal to 12 in.). Even so, the soil colloids retain relatively good amounts of phosphorus and potassium in the surface 30 cm for native plant growth. The surface pH hovers around 7.7 – 8.1, but rises steadily below 30 cm. Surface SAR values are very low, rising to less desireable levels at 120 cm. An average carbonate concentration for the surface 30 cm is 36%. This will translate into cemented soils upon reclamation and it will be imperative that some mulch is used on the interim and final reclamation.

Findings:

The information provided meets the requirements of the regulations for soils resource information.

PRIME FARMLAND

Regulatory Reference: 30 CFR 785.16, 823; R645-301-221, -302-270.

Analysis:

Following the protocol required by the National Cooperative Soil Survey, the Order II soil survey documented the site conditions and the dry stony soil which has never been cultivated.

Findings:

R645-303-313.100 requires that the applicant submit a statement that no prime farmland exists.

OPERATION PLAN

TOPSOIL AND SUBSOIL

Regulatory Reference: 30 CFR Sec. 817.22; R645-301-230.

Analysis:

Topsoil Removal and Storage

The Permittee describes removal of topsoil from only 1.41 acres of the 7.32 acres under SITLA lease. The areas to have topsoil removed will correspond to the access road, the pond, and Appendix 7-66 recommends the surface foot of topsoil be salvaged. However, given that the surface is approximately 50% boulders, a realistic depth of six inches topsoil is expected to be salvaged from a disturbed area of 1.41 acres. A total stored topsoil volume of 1,137 cu yds is expected (Chap 2). The 1.41 acres to be disturbed should be designated on a map. Chapter 5 does indicate that the area to be disturbed will be flagged. Chapter 5 also describes the construction sequence step by step.

The topsoil storage pile will be 40 ft. wide x 170 ft. long x 10 ft. high (Chap 2, App 7-66). The Sections and Details provided with the SITLA lease illustrates a pile with 2h:1v slopes and a triangular cross-section. This configuration may have been the easiest to portray for

calculation purposes. However, in practice, the top of the pile should be leveled so that the pile is trapezoidal in cross section.

Findings:

R645-301-231/100, The plan should outline on a map the area designated for boulder removal and topsoil salvage.

R645-301-231.400, The topsoil storage pile should not be triangular in cross section, but trapezoidal.

SPOIL AND WASTE MATERIALS

Regulatory Reference: 30 CFR Sec. 701.5, 784.19, 784.25, 817.71, 817.72, 817.73, 817.74, 817.81, 817.83, 817.84, 817.87, 817.89; R645-100-200, -301-210, -301-211, -301-212, -301-412, -301-512, -301-513, -301-514, -301-521, -301-526, -301-528, -301-535, -301-536, -301-542, -301-553, -301-745, -301-746, -301-747.

Analysis:

Coal Mine Waste

Article 5.3 of the SITLA Lease specifies that no hazardous waste will be brought to the SITLA property and further defines hazardous waste as any regulated toxic substance and PCB's, and petroleum products.

The 1976 Resource Conservation and Recovery Act (RCRA) defines hazardous waste by waste stream (F, K, P, or U waste as defined in 40 CFR 261 SubPart D) or by characteristics (40 CFR 261 SubPart C) of ignitability (flashpoint , 140F), corrosivity (pH < 2 or > 12.5), reactivity (with water), and toxicity. The code 40 CFR 261.24 outlines 40 contaminants to be tested by the Toxicity Characteristic Leaching Procedure (TCLP) when defining toxicity. Table 1 of the code lists their maximum allowable concentrations in solid waste. (The allowable limits for the 8 toxic metals listed in Table 1 are as follows:
Arsenic = 5 ppm, (1 ppm is equal to 1 mg/L)
Barium = 100 ppm
Cadmium = 1 ppm
Chromium = 5 ppm
Lead = 5 ppm
Mercury = 0.2 ppm
Selenium = 1.0 ppm
Silver = 5 ppm.

Appendix 7-65 describes the temporary the mine water treatment facility producing the iron sludge. Attachment 10 of Appendix 7-66 provides an analysis of metals using EPA Method 200.7 and 200.8 on grab samples of the sediment, taken in February 2011 and of the flock (flocculent) taken in April 2010. (Analyses were performed by SGS Labs in Huntington and Horizon Lab in Price.) The concentrations of analytes all fell within the EPA limits for the metals tested. On the two sampling dates, the following metal cations were found in highest concentrations: aluminum (3,260 mg/L), barium (0.825 mg/L), iron (1,110 mg/L) ,zinc (2.1 mg/L) , and nickel (0.428 mg/L).

Soil has limited capacity to impound water (p. 4, Attachment 6) and so placement of the waste into the unlined pond must include a sampling plan. Grab sampling of the waste should be monitored in accordance with 40 CFR 264.13 and in accordance with R645-301-536.320.

Findings:

R645-301-536.320, A sampling and monitoring plan for the waste should be developed to be conducted at five year intervals (mid-term) or with every 7.5 inches of waste deposited. Grab sampling of the waste should be monitored in accordance with 40 CFR 264.13 and with the parameters described in the Division's Guidelines for Topsoil and Overburden, Tables 3 & 7.

RECLAMATION PLAN

BACKFILLING AND GRADING

Regulatory Reference: 30 CFR Sec. 785.15, 817.102, 817.107; R645-301-234, -301-537, -301-552, -301-553, -302-230, -302-231, -302-232, -302-233.

Analysis:

General

App. 7-66, Chapter 5 describes 2,363 cu yds of subsoil stockpiled in the berm around the pond. This material will cover the 0.5 acre pond area (200ft x 100 ft) to a depth of three feet. Chap. 3 describes replacement of this subsoil in 18 inch lifts over an accumulated layer of dried sludge (estimated to be 24 inches deep after 16 years, Chap. 5). Using the permittee's estimates, of 1.5 inch accumulation per year, the life of this facility is twenty four years, at which time the dried waste will be at the design maximum of 36 inches, leaving 24 inches of freeboard (Chap. 5). (The plan does indicate that there is room for expansion to the east and west within the permitted area.)

In accordance with R645-301-536, the plan should provide for measurement of the iron precipitate layer every five years, occurring during the mid-term review.

With every 7.5 inches accumulation (permittee estimates this will occur every 5 years), the plan would ideally provide for ripping of the precipitate surface into the subsoil, prior to placement of additional waste, although there is no regulatory requirement for this treatment.

Upon final reclamation, the first 18 inch lift should be incorporated into the mine waste with ripping or other tillage. In this manner, the waste will be incorporated into the soil and will not create a chemical or physical barrier to roots, promoting revegetation success, in accordance R645-301-542.730

Findings:

R645-301-536, the plan should provide for depth measurement of the iron precipitate layer every five years, occurring during the mid-term review.

R645-301-542.730, Upon final reclamation, the first 18 inch lift should be incorporated into the mine waste with ripping or other tillage. In this manner, the waste will be incorporated into the soil and will not create a chemical or physical barrier to roots, promoting revegetation success.

TOPSOIL REDISTRIBUTION

Regulatory Reference: 30 CFR Sec. 817.22; R645-301-240.

Analysis:

The Burma evaporation pond disturbed area is recorded as 7.32 acres. However the Permittee anticipates soil salvage and redistribution from only 1.41 acres. Redistribution depth of the 1,137 cu yd topsoil will be six inches over the 1.41 acres as described in (Chap. 2). Chap. 3 indicates that the topsoil will be respread to a depth of 12 inches in item c.

An application of 1 T/ac straw mulch will be applied to the regarded surface. Seed will either be hand broadcast or hydroseeded. The area will be treated with wood fiber mulch and 500 lbs/ac tackfier.

Findings:

R645-301-244, The type and quantity of wood fiber mulch (hydromulch) should be specified.

R645-301-242, Redistribution depth of the 1,137 cu yd topsoil will be six inches over the 1.41 acres as described in (Chap. 2), however, Chap. 3 indicates that the topsoil will be respread to a depth of 12 inches in item c. Please make the appropriate correction.

STABILIZATION OF SURFACE AREAS

Regulatory Reference: 30 CFR Sec. 817.95; R645-301-244.

Analysis:

Article 10.2 of the SITLA lease requires intermediate reclamation of disturbed areas not required for continuing operations, along with control of noxious weeds. Article 12.2 requires reclamation upon termination of the lease and stipulates 4 feet of cover over the iron precipitate and control of noxious weeds.

The permitted area is 7.32 acres; however the proposed disturbed area is 1.41 acres. App 7-66 describes interim reclamation on the outslope of the pond containment berm during operations. The plan should also describe interim reclamation of land which does not have topsoil removed, but which may be affected by equipment moving boulders and topsoil from the pond location to storage locations.

Use of surface mulch is described in Chap 2; however the quantity per acre is not described. The seed mix is provided in Attachment 8.

An average carbonate concentration for the surface foot is 36%. This will translate into cemented soils upon reclamation and it will be imperative that some mulch is used on the interim and final reclamation.

Findings:

R645-301-234.230, Use of surface mulch to provide protection and vegetation establishment on the topsoil stockpile is described in Chap. 2, however the quantity per acre should also be described.

R645-301-232.400, The permitted area is 7.32 acres, however the proposed disturbed area is 1.41 acres. The plan should describe interim reclamation of the land which will not have

topsoil removed, but which may be affected by equipment moving boulders and topsoil to storage locations.

RECOMMENDATIONS:

The application is not recommended for approval until the issues identified in this memo are resolved.

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